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www.rurdev.usda.gov/co/index.html

SUBJECT: **ARCHITECTURAL TECHNICAL GUIDE 0023 (January 1, 2005)**
Design Review Checklists:
Requirements for Single Family Housing New Construction, Existing Construction, and Additions to Existing Construction

PURPOSE:

The purpose of this Architectural Technical Guide (ATG) is to provide three checklists intended to assist Rural Development reviewers of construction contract documents for single family housing new construction, existing rehabilitative construction, and additions to existing construction. The first checklist summarizes broadscope construction contract documents review responsibilities, referencing many related regulations and ATGs. The second checklist presents specific technical criteria recommendations for various components of construction that should be incorporated into construction contract documents to introduce special Federal requirements and to hopefully reduce many homeowner/contractor disputes. It is primarily intended for Rural Development reviewers. The third checklist is intended to serve as an attachment to Form RD 1924-2, *"Description of Materials",* to summarize Rural Development's special technical requirements.

IMPLEMENTATION RESPONSIBILITIES:

Broadscope Construction Contract Documents Review Responsibilities

Rural Development construction contract document reviewers should insure: (1) that contract documents for new and rehabilitative construction under the Section 502 Housing Program are complete and accurately state Rural Development's unique technical requirements and (2) that pertinent construction issues are adequately discussed with borrowers and contractors in advance of actual construction work.

Exhibit A to this ATG was developed to provide Rural Development reviewers a broad checklist of the procedural requirements applicable to the review of construction exhibits for new construction, additions to existing construction, and, as applicable, for rehabilitative construction. Reviewers should strive to insure that all listed procedures are properly satisfied.

Specific Construction Contract Documents Technical Criteria

Exhibit B to this ATG was developed to provide Rural Development reviewers a checklist of specific Colorado Rural Development technical requirements which usually should either be stated on Form RD 1924-2, *"Description of Materials"*, or be described on the construction drawings. The criteria are presented in the exact sequence shown on Form RD 1924-2 which can be downloaded from the Internet at:

http://www.rurdev.usda.gov/regs/forms/1924-02.pdf

Rural Development reviewers should insure that, after all items discussed within the checklists have been adequately addressed, three sets of identical construction documents (one for the borrower, one for the contractor, and one for the Rural Development office) are signed by all parties at the Preconstruction Conference and that all major points addressed in these documents are discussed, to insure future misunderstandings are kept to a minimum. It is better, in general, to provide too much information in the construction documents than too little. Also, all documents should be reasonably scrutinized to insure conflicting language is minimized, within the constraints of time.

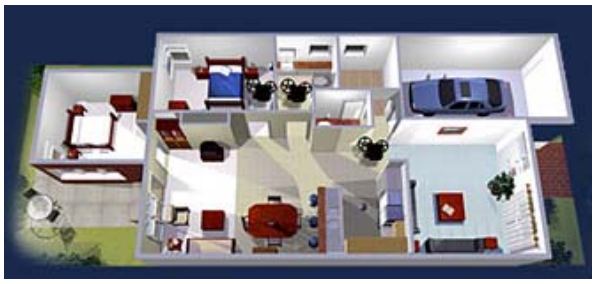
Should Rural Development reviewers desire to simply attach the Exhibit B criteria to Form RD 1924-2, this may be accomplished by utilizing the itemized Rural Development technical requirements presented as Exhibit C to this ATG. It is also presented in the exact sequence shown on Form RD 1924-2.

Should you have any further questions on this subject, please contact the State Architect.

DAVID W. RIGIROZZI
State Architect
USDA/Rural Development

Attachments:
Exhibit A, *"Checklist of Broadscope Colorado Rural Development Construction Contract Document Review Requirements"*
Exhibit B, "*Checklist of Specific Colorado Rural Development Technical Requirements for New, Existing, and Additions to Existing Single Family Housing Construction"*
Exhibit C, *"Colorado Rural Development Technical Requirements for New, Existing, and Additions to Existing Single Family Housing Construction"*

Checklist of Broadscope Colorado Rural Development Construction Contract Document Review Requirements



Rural Development construction contract document reviewers should insure: (1) that contract documents for new and rehabilitative construction under the Section 502 Housing Program are complete and accurately state Rural Development's unique technical requirements and (2) that pertinent construction issues are adequately discussed with borrowers and contractors in advance of actual construction work.

This exhibit was developed to provide Rural Development reviewers a broad checklist of the procedural requirements applicable to the review of construction exhibits for new construction, additions to existing construction, and, as applicable, for rehabilitative construction. Reviewers should strive to insure that all listed procedures are properly satisfied.

_____Land Development
_____Building Plan Certification
_____Building Foundation Design & Certification
_____Site Grading Design & Certification
_____Thermal Performance Standards
_____Livability/Good Practice/Marketability
_____Completeness
_____USDA Colorado Specific Requirements
_____Modular Housing Requirements
_____Manufactured Housing Requirements

Checklist of Broadscope Colorado Rural Development Construction Contract Document Review Requirements

[The following cited requirements should be addressed, as applicable, for each application for Rural Development Single Family Housing Programs financial assistance for new construction, existing rehabilitative construction, and additions to new construction.]

_____Land Development:

HB-1-3550:

1.11	Construction standards
5.4	Modest sites

http://www.rurdev.usda.gov/regs/hblist.html#hb1

RD Instruction 1924-C:

1924.106	Location
1924.107	Utilities
1924.108	Grading & drainage
1924.115	Access

http://www.rurdev.usda.gov/regs/regs/pdf/1924c.pdf

[Review accomplished by Rural Development personnel]

_____Building Plan Certification:

HB-1-3550:

1.11	Construction standards
5.21	Disseminating the standards

http://www.rurdev.usda.gov/regs/hblist.html#hb1

RD Instruction 1980-D:

1980.340	Acquisition, construction, & dev.

http://www.rurdev.usda.gov/regs/regs/pdf/1980d.pdf

RD Instruction 1924-A:

1924.4 (h)	Development Standard
1924.5 (d)	Construction requirements
1924.5 (f)	Applicant responsibility

http://www.rurdev.usda.gov/regs/regs/pdf/1924a.pdf

ARCHITECTURAL TECHNICAL GUIDE 0022 (January 1, 2005)

Development Standards:
Requirements for New and Existing SFH and MFH Construction Projects
http://www.rurdev.usda.gov/co/

RD Form 1924-25:
http://www.rurdev.usda.gov/regs/forms/1924-25.pdf

[RD Form 1924-25 Plan Certification is intended to be provided by non-Rural Development personnel]

_____Building Foundation Design & Height Certification:

ARCHITECTURAL TECHNICAL GUIDE 0002 (January 1, 2005) Professional Foundation and Concrete Slab-on-Grade Design and Certification: Requirements for Single Family Housing New Construction and Additions
http://www.rurdev.usda.gov/co/
ARCHITECTURAL TECHNICAL GUIDE 0018 (January 1, 2005) Foundation Height Certification: Requirements for Single Family Housing New and Existing Construction
http://www.rurdev.usda.gov/co/
[Designs & certifications are intended to be provided by non-Rural Development personnel]

_____Site Grading Design & Certification:

ARCHITECTURAL TECHNICAL GUIDE 0013 (January 1, 2005) Special Site Grading Design Criteria for Surface Storm Water Drainage and to Accommodate Persons with Disabilities: Requirements for Single Family Housing New and Existing Construction
http://www.rurdev.usda.gov/co/
[Design & certification are intended to be provided by non-Rural Development personnel]

_____Modest Design:

HB-1-3550:
5.6 Modest housing
http://www.rurdev.usda.gov/regs/hblist.html#hb1
[Review accomplished by Rural Development personnel]

_____Thermal Performance Standards:

HB-1-3550:
5.21
http://www.rurdev.usda.gov/regs/hblist.html#hb1
RD Instruction 1980-D:
1980.340 Acquisition, construction, & dev.
http://www.rurdev.usda.gov/regs/regs/pdf/1980d.pdf
RD Instruction 1924-A:
Exhibit D
http://www.rurdev.usda.gov/regs/regs/pdf/1924a.pdf
ARCHITECTURAL TECHNICAL GUIDE 0015 (January 1, 2005)
Thermal Performance Supplement for Existing Construction Financed by the USDA/Rural Housing Service's Section 502 and Section 504 Single Family Housing Programs
http://www.rurdev.usda.gov/co/

ARCHITECTURAL TECHNICAL GUIDE 0016
(January 1, 2005)
Summary of Thermal Performance Construction Standards and Eligible Locations for Air Conditioning for New and Existing Construction Financed by the USDA/Rural Housing Service's Single Family Housing (SFH) Programs
http://www.rurdev.usda.gov/co/
RD Form 1924-25:
http://www.rurdev.usda.gov/regs/forms/1924-25.pdf
[RD Form 1924-25 Plan Certification is intended to be provided by non-Rural Development personnel]

_____**Livability/Good Practice/Marketability:**

RD Instruction 1924-A:
Guide 2
http://www.rurdev.usda.gov/regs/regs/pdf/1924a.pdf
HUD Manual of Acceptable Practice, Handbook 4930.1
[Guide 2 is enforced through the appraisal process]
[Review accomplished by Rural Development personnel]

_____**Completeness:**

HB-1-3550:
5.21 Disseminating the standards
http://www.rurdev.usda.gov/regs/hblist.html#hb1
RD Instruction 1924-A
Exhibit C
http://www.rurdev.usda.gov/regs/regs/pdf/1924a.pdf
[Review accomplished by Rural Development personnel]

ARCHITECTURAL TECHNICAL GUIDE 0023
(January 1, 2005) Design Review Checklists: Requirements for Single Family Housing New Construction, Existing Construction, and Additions to Existing Construction
http://www.rurdev.usda.gov/co/

_____**USDA Colorado Specific Requirements:**

ARCHITECTURAL TECHNICAL GUIDE 0001
(January 1, 2005)
Termite Inspection, Treatment and Certification: Requirements for New and Existing SFH and MFH Construction Projects
http://www.rurdev.usda.gov/co/
ARCHITECTURAL TECHNICAL GUIDE 0003
(January 1, 2005)
Carpet and Carpet Pad Certification: Requirements for Single Family Housing New Construction and Additions
http://www.rurdev.usda.gov/co/

ARCHITECTURAL TECHNICAL GUIDE 0005 (January 1, 2005)
Seismic Safety Requirements for New Building Construction and Substantial Rehabilitation Using Rural Housing Service (RHS), Rural Business - Cooperative Service (RBS), and Rural Utilities Service (RUS) Loan, Grant, and Guaranteed Funds
http://www.rurdev.usda.gov/co/

ARCHITECTURAL TECHNICAL GUIDE 0006 (January 1, 2005)
Kitchen and Bathroom Exhaust Ventilation: Requirements for New and Existing Single Family Housing and Multi-Family Housing Construction
http://www.rurdev.usda.gov/co/

ARCHITECTURAL TECHNICAL GUIDE 0014 (January 1, 2005)
Section 502 Rural Housing Demonstration Program
http://www.rurdev.usda.gov/co/

ARCHITECTURAL TECHNICAL GUIDE 0019 (January 1, 2005)
Lead-Based Paint Investigation, Mitigation, and Certification: Requirements for Single Family Housing and Multi-Family Housing Existing Construction
http://www.rurdev.usda.gov/co/

ARCHITECTURAL TECHNICAL GUIDE 0020 (January 1, 2005)
Mold Investigation, Mitigation, and Certification: Requirements for Single Family Housing and Multi-Family Housing Existing Construction
http://www.rurdev.usda.gov/co/

ARCHITECTURAL TECHNICAL GUIDE 0021 (January 1, 2005)
Asbestos Investigation, Mitigation, and Certification: Requirements for Single Family Housing and Multi-Family Housing Existing Construction
http://www.rurdev.usda.gov/co/

ARCHITECTURAL TECHNICAL GUIDE 0023 (January 1, 2005) Design Review Checklists: Requirements for Single Family Housing New Construction, Existing Construction, and Additions to Existing Construction
http://www.rurdev.usda.gov/co/

ARCHITECTURAL TECHNICAL GUIDE 0024 (January 1, 2005)
Accessible Design for Persons with Disabilities: Requirements for Single Family Housing and Multi-Family Housing New and Existing Construction
http://www.rurdev.usda.gov/co/

[Review accomplished by Rural Development personnel]

_____Modular Housing:

HB-1-3550:

5.21	Disseminating the standards
9.16 A.	Authorized loan purposes

http://www.rurdev.usda.gov/regs/hblist.html#hb1

RD Instruction 1924-A:

Exhibit B

http://www.rurdev.usda.gov/regs/regs/pdf/1924a.pdf

[Review accomplished by Rural Development personnel]

_____Manufactured Housing:

HB-1-3550:

9.16	Authorized loan purposes
9.17	Dealer-contractor requirements
9.18	Processing procedures
9.19	Construction & site requirements
9.20	Loan closing

http://www.rurdev.usda.gov/regs/hblist.html#hb1

RD Instruction 1924-A:

Exhibit J

http://www.rurdev.usda.gov/regs/regs/pdf/1924a.pdf

ARCHITECTURAL TECHNICAL GUIDE 0004 (January 1, 2005)

Change in the Thermal Performance Construction Standard for New Manufactured Housing Financed by Rural Housing Service Single Family Housing (SFH) and Multi-Family Housing (MFH) Programs

http://www.rurdev.usda.gov/co/

ARCHITECTURAL TECHNICAL GUIDE 0007 (January 1, 2005)

Required Designs for Permanent Perimeter Enclosures:
Requirements for Single Family Housing Direct Financed and Guaranteed Programs and Multi-Family Housing Direct Program Manufactured Housing

http://www.rurdev.usda.gov/co/

[Review accomplished by Rural Development personnel]

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Checklist of Specific Colorado Rural Development Technical Requirements for New, Existing, and Additions to Existing Single Family Housing Construction

This Exhibit was developed to provide Rural Development reviewers a checklist of specific Colorado Rural Development technical requirements which usually should either be stated on Form RD 1924-2, *"Description of Materials"*, or be described on the construction drawings. The criteria are presented in the exact sequence shown on Form RD 1924-2 which can be downloaded from the Internet at:

http://www.rurdev.usda.gov/regs/forms/1924-02.pdf

Rural Development reviewers should insure that, after all items discussed within the checklists have been adequately addressed, three sets of identical construction documents (one for the borrower, one for the contractor, and one for the Rural Development office) are signed by all parties at the Preconstruction Conference and that all major points addressed in these documents are discussed, to insure future misunderstandings are kept to a minimum. It is better, in general, to provide too much information in the construction documents than too little. Also, all documents should be reasonably scrutinized to insure conflicting language is minimized, within the constraints of time.

The following discussion is not intended to be all-encompassing or compliant with all local building department special code requirements. It focuses only on selected items. Form RD, 1924-2, *"Description of Materials",* should be completed in entirety. Sufficient language should be inserted into the construction documents to clearly convey the covered points of discussion.

[Cross reference with Form RD, 1924-2, *"Description of Materials"*, which contains the following sections]

1. Excavation
2. Foundations
3. Chimneys
4. Fireplaces
5. Exterior Walls
6. Floor Framing
7. Subflooring
8. Finish Flooring
9. Partition Framing
10. Ceiling Framing
11. Roof Framing
12. Roofing
13. Gutters and Down spouts
14. Lath and Plaster
15. Decorating
16. Interior Doors and Trim
17. Windows
18. Entrances and Exterior Detail
19. Cabinets and Interior Detail
20. Stairs
21. Special Floors and Wainscot
22. Plumbing
23. Heating
24. Electric Wiring
25. Lighting Fixtures
26 Insulation
27. Miscellaneous

Hardware
Special Equipment
Porches
Terraces
Garages
Walks and Driveways
Other Onsite Improvements
Landscaping, Planting, and Finish Grading

Form RD 1924-2 can be downloaded from the Internet at:

http://www.rurdev.usda.gov/regs/forms/1924-02.pdf

Checklist of Specific Colorado Rural Development Technical Requirements for New, Existing, and Additions to Existing Single Family Housing Construction

1. EXCAVATION:

_____Acceptable sub grades for foundation and slab work:

All sub grades for foundation and slab work should comply with the recommendations of the engineered foundation design, due to the variability in subsoils bearing qualities. Also reference **ARCHITECTURAL TECHNICAL GUIDE 0002 (January 1, 2005)** Professional Foundation and Concrete Slab-on-Grade Design and Certification: Requirements for Single Family Housing New Construction and Additions.
http://www.rurdev.usda.gov/co/

2. FOUNDATIONS:

_____Minimum concrete compressive strength:

Application	Minimum 28-day compressive strength (psi)
Footings	2,000
Foundation walls	3,000*
Interior slabs	3,000
Exterior slabs	3,500*

*air-entrained @ 5-7%

_____Minimum reinforcing:

Application	Minimum reinforcing
Foundation wall	2 - #5 deformed rib steel bars, located in the footing or at the bottom of the foundation wall
Slabs	6x6 10/10 steel welded wire mesh or fiberglass strands

_____Sillplates:

Acceptable wood products: foundation grade redwood or pressure-treated lumber.

_____Anchor bolts:

Minimum 1/2" diameter.

Minimum 7" embedment in concrete foundation system.

Minimum 2 bolts per piece of lumber.

One bolt within 12" of each end of each piece of lumber.

Maximum spacing: 6'-0" o.c.

_____Posts under girders:

Acceptable products:

Application	Acceptable material
Bottom of post is > 6" above grade	Pressure-treated lumber, Foundation redwood, Untreated lumber, Reinforced concrete block piers, Reinforced concrete piers, or Steel columns
Bottom of post is within 6" of grade	Pressure-treated lumber, Foundation redwood, Reinforced concrete block piers, Reinforced concrete piers, or Steel columns

All posts should be adequately secured at the top and bottom.

_____Termite protection:

All work should be accomplished by a Colorado licensed applicator.

Treatment required at all locations below 8,500 feet above sea level.

_____Crawlspace ventilation:

Crawl space floors should be covered with minimum 6-mil polyethylene film, lapped minimum 6".

_____Acceptable foundation insulation:

Application	Method
Framed and masonry wall areas above exterior finish grade:	Minimum R=19 rigid, batt, or sprayed insulation*
Framed and masonry wall areas below exterior finish grade:	Minimum R=10 rigid, batt, or sprayed insulation
Crawlspaces:	Foundation wall insulation to be installed down to within 2 inches from the top of exposed footings and/or to within 6 inches of the crawlspace floor elevation.
Basements:	Foundation wall insulation to be installed minimum 4 feet down basement walls.

*Protect exterior located insulation above finish grade by a suitable flashing or similar product.

3. CHIMNEYS:

All kitchen and bathroom exhaust fan duct systems should contain a backdraft damper and should discharge directly to the exterior via wall or roof located jacks. Exhaust fan duct systems should not discharge into attics, crawlspaces, or basements. Also reference **ARCHITECTURAL TECHNICAL GUIDE 0006 (January 1, 2005)** Kitchen and Bathroom Exhaust Ventilation: Requirements for New and Existing Single Family Housing and Multi-Family Housing Construction.
http://www.rurdev.usda.gov/co/

4. FIREPLACES:

Fireplaces should be installed in strict accordance with manufacturer's installation data.

5. EXTERIOR WALLS:

_____Acceptable corner bracing:

The exact method of bracing to be used for wind resistance should be identified. Several methods are permitted by the International Building Code.

_____Acceptable sheathing:

The exact sheathing material should be identified.

_____Acceptable siding:

The exact siding material(s) to be used should be identified. All siding materials should be installed in strict accordance with manufacturer's printed instructions, including the use of acceptable underlying supporting framing systems.

_____Masonry veneer:

Masonry veneer should be installed with: (1) an air space between the veneer and the wall framing and (2) weep holes located at maximum 4'-0" o.c.

6. FLOOR FRAMING:

_____Joists:

The exact wood species, grade(s), size(s), and repetitive spacing(s) to be used should be identified. Factory engineered truss joist systems are acceptable.

7. SUBFLOORING:

_____Acceptable subflooring installation:

All subflooring should be fastened in accordance with International Building Code requirements as well as manufacturer's printed recommendations. All subflooring should be glued directly to underlying floor framing members. The exact type of subflooring materials to be used should be identified and should be span-rated for the intended spans.

8. FINISH FLOORING:

(This section is intended for finish wood floors only. Other finish floor products should be specified in section 21.)

9. PARTITION FRAMING:

_____Framing materials and installation:

The exact wood species, grade(s), size(s), and repetitive spacing(s) should be identified.

10. CEILING FRAMING:

(This section is applicable in situations where rafters would be used in conjunction with separate roof framing rather than situations where pre-engineered roof trusses would be employed.)

11. ROOF FRAMING:….

_____Acceptable roof framing:

Where rafters are to be used, the exact wood species, grade(s), size(s), and repetitive spacing(s) should be identified.

Roof truss systems should be pre-engineered.

12. ROOFING:

_____Acceptable sheathing:

The exact sheathing types, thicknesses, and span ratings should be identified.

_____Acceptable roofing:

The exact type of roofing material to be used should be identified. Composition asphalt or fiberglass shingles, in either a 3-tab or T-lock profiles, are acceptable provided they have a minimum weight of 220 pounds per square (square = 100 s.f.).

_____Acceptable roof underlayment:

The exact type of roof underlayment should be identified. A single ply of 15 pounds per square underlayment, with the thickness doubled for the lowest three feet of the roof surface, would be acceptable except in areas with historically heavy snow conditions, where additional ice damming protection should be specified.

_____Acceptable flashing:

The exact type of flashing material to be used should be identified.

_____Acceptable attic ventilation:

Attic ventilation should be provided in accordance with International Building Code requirements.

Gable-end type vents are discouraged and a combination of soffit and ridge vents is encouraged.

13. GUTTERS AND DOWN SPOUTS:

_____Acceptable gutters:

A complete gutter/downspout/splashblock system should be specified whenever one or more of the following situations apply:

(a) The roof overhang for a one-story portion of a structure is less than 12" wide;
(b) The roof overhang for a two-story portion of a structure is less than 24" wide;
(c) A building entrance is on the low side of eaves;
(d) Problem soil conditions are present; or
(e) The homeowner desires to have such a system installed.

Minimum 30" long concrete or plastic splashblocks or minimum 30” long downspout extensions should be specified for positioning under all downspouts and hosebibs and they should be properly installed to drain away from foundation walls.

If problem soil conditions are present, minimum 60" long hinged downspout extensions should be installed in lieu of the splashblocks or shorter downspout extensions.

Either galvanized steel, natural aluminum, factory painted steel or aluminum, or plastic gutter/downspout systems should be installed in accordance with the manufacturer's printed instructions.

14. LATH AND PLASTER:

(Lath and plaster construction techniques have mostly been supplanted by gypsum drywall techniques.)

_____Acceptable drywall thicknesses:

Minimum 5/8" thick standard gypsum drywall should be installed at ceiling locations where the supporting framing spacing exceeds 16" on center.

_____Acceptable drywall types:

Moisture-resistant drywall should be installed at all bathroom splash areas.

15. DECORATING:

_____Special painting requirements:

Paint with any lead content should not be used.

A minimum of 2 coats of paint or 1 coat of primer + 1 coat of paint should be provided in all cases.

16. INTERIOR DOORS AND TRIM:

_____Acceptable finishes:

The exact type of finish and hardware should be identified.

Painted, stained, or prefinished doors and trim are acceptable.

17. WINDOWS:

_____Acceptable aluminum windows:

Aluminum windows should contain a thermal break in both the fixed and operable sashes.

_____Window installation:

The perimeter of all window units should be attractively caulked with a paintable silicon compound at both the interior and exterior sides. Windows should be flashed in accordance with manufacturer's printed instructions.

_____Acceptable window glazing types:

The exact type of glazing to be installed should be identified. The most cost and thermally effective glazing type appears to be a low-emissivity (low e) coated, 2-pane, glazing assembly with an evacuated space between the glass panes.

18. ENTRANCES AND EXTERIOR DETAIL:

_____Acceptable entrance doors:

All exterior doors and doors between the living area and garages should be a painted, pre-hung, steel-clad, insulated-core type.

19. CABINETS AND INTERIOR DETAIL:

_____Acceptable kitchen and bathroom cabinets:

All kitchen and bathroom cabinets shall be labeled or otherwise certified as conforming to the American National Standards Institute/Kitchen Cabinet Manufacturers Association (ANSI/KCMA) Standard A161.1-1990.

20. STAIRS:

(There are no special requirements other than general code compliance.)

21. SPECIAL FLOORS AND WAINSCOT:

_____Acceptable kitchen, bathroom, and utility room flooring materials:

The exact type of flooring materials to be used should be identified.

Only sheet vinyl flooring, conforming to either Federal Specification, FS L-F-001641-71, FS L-F-475A, or FS L-F-00450A, should be installed in kitchens, bathrooms, and utility rooms.

All carpeting should conform to either: (1) U.S. Department of Housing and Urban Development (HUD), Use of Materials Bulletin, UM-44d, Type 1, Class 1, for non-handicap applications, or (2) HUD, Use of Materials Bulletin, UM-44-d, Type 2, Class 1, for handicap applications.

All proposed carpeting materials should be currently certified by one of the independent testing laboratories as complying with UM-44d. Also reference **ARCHITECTURAL TECHNICAL GUIDE 0003 (January 1, 2005)** Carpet and Carpet Pad Certification: Requirements for Single Family Housing New Construction and Additions
http://www.rurdev.usda.gov/co/

All proposed bathroom accessories should be exactly identified.

22. PLUMBING:

_____Acceptable plumbing fixtures:

The following types of fixtures are recommended, for their combined advantages of longevity and modest cost:

Application	Type	Color
Kitchen sink:	Stainless steel	Natural
Lavatory:	Porcelain steel	White
	Vitreous china, or	White
	ABS plastic*	White
Water closet:	Two-compartment	White
Bathtub/enclosure:	Fiberglass*	White
Tub/shower/enclosure:	Fiberglass*	White
Shower/enclosure:	Fiberglass*	White

*All plastic and fiberglass plumbing fixtures should be labeled as conforming to U.S. Department of Housing and Urban Development, Use of Materials Bulletin, UM-73a.

_____Washer hot and cold water supplies:

A washer drainbox, with hot and cold water hook-ups, should be provided.

_____Acceptable hosebibs:

A minimum of two (2) hosebibs should be provided, one for the front yard and one for the rear yard.

All hosebibs should be a freezeproof type and should be plumbed with an inline backflow preventer.

_____Acceptable water heaters:

Water heaters should be provided with a minimum 5-year warranty against tank leaks.

Water heaters should be plumbed with dielectrically compatible unions.

Water heaters should be provided with a temperature and pressure relief valve, drained directly to either: (1) the exterior of the residence or (2) 6" above the floor, if a floor drain is provided next to the appliance.

Water heaters are recommended to be sized as follows:

Application (# of bedrooms/bathrooms)	Fuel Type	Minimum Tank Size (Gallons)	Minimum Recovery Rate (Gallons per hour)
2/1	Gas	30	30
2/1	Electric	30	14
3/1	Gas	30	30
3/1	Electric	40	18
3/1.5	Gas	30	30
3/1.5	Electric	40	18
4/2	Gas	40	32
4/2	Electric	50	22

_____Acceptable footing drain connections:

Where required, footing drains should connect to one of the following reliefs, ranked from most to least preferable, from top to bottom:

(a) Piped to a storm sewer system.
(b) Daylighted to a street storm sewer system, preferably on a south-facing slope.
(c) Daylighted to a point on the property, preferably on a south-facing slope.
(d) Piped to a sanitary sewer system, if permitted by the local building department.

All footing drainage systems should be sloped at minimum 1/8" per foot. Reference **ARCHITECTURAL TECHNICAL GUIDE 0002 (January 1, 2005)** Professional Foundation and Concrete Slab-on-Grade Design and Certification: Requirements for Single Family Housing New Construction and Additions for more information on when a footing drain system would be required.

http://www.rurdev.usda.gov/co/

23. HEATING:

_____Acceptable boiler/hot water baseboard heating systems:

Boilers are recommended to be sized as follows:

Boiler Efficiency Rating (percent)	Boiler Input Rating (BTUH*) for Altitude (FASL**) below 4,000'-5,000'	5,000'-6,000'	6,000'+
65-70	60,000-70,000	65,000-75,000	70,000-80,000
70-80	55,000-65,000	60,000-70,000	65,000-75,000
80-90	50,000-60,000	55,000-65,000	60,000-70,000
90+	45,000-55,000	50,000-60,000	55,000-65,000

*British Thermal Units per Hour **Feet above Sea Level

All circulating piping, located in unheated spaces, should be insulated with a minimum 1" thick cellular foam jacket.

_____Acceptable furnace/forced air heating systems:

Furnaces are recommended to be sized as follows:

Furnace Efficiency Rating (percent)	Furnace Input Rating (BTUH*) for Altitude (FASL**) below		
	4,000'-5,000'	5,000'-6,000'	6,000'+
65-70	60,000-70,000	65,000-75,000	70,000-80,000
70-80	55,000-65,000	60,000-70,000	65,000-75,000
80-90	50,000-60,000	55,000-65,000	60,000-70,000
90+	45,000-55,000	50,000-60,000	55,000-65,000

*British Thermal Units per Hour **Feet above Sea Level

All ductwork, located in unheated spaces, should be insulated with a minimum 1" thick batt insulation jacket.

ARCHITECTURAL TECHNICAL GUIDE 0016 (January 1, 2005) Summary of Thermal Performance Construction Standards and Eligible Locations for Air Conditioning for New and Existing Construction Financed by the USDA/Rural Housing Service's Single Family Housing (SFH) Programs.

http://www.rurdev.usda.gov/co/

_____Acceptable electric resistance heating systems:

All types of electric resistance heating systems are considered acceptable. The amount of heat source to be installed in the residence should be clearly identified.

_____Acceptable kitchen rangehoods:

Kitchen rangehoods should meet the requirements of **ARCHITECTURAL TECHNICAL GUIDE 0006 (January 1, 2005)** Kitchen and Bathroom Exhaust Ventilation: Requirements for New and Existing Single Family Housing and Multi-Family Housing Construction.

http://www.rurdev.usda.gov/co/

_____Acceptable bathroom ventilation:

Bathroom exhaust vents should meet the requirements of **ARCHITECTURAL TECHNICAL GUIDE 0006 (January 1, 2005)** Kitchen and Bathroom Exhaust Ventilation: Requirements for New and Existing Single Family Housing and Multi-Family Housing Construction.

http://www.rurdev.usda.gov/co/

_____Acceptable dryer duct exhausting:

A dryer duct sleeve, with integral backdraft damper, should be provided at an exterior wall for the laundry area.

24. ELECTRIC WIRING:

_____Acceptable wiring conductors for electrical service and branch circuits:

It should be stated that all electrical power systems should meet the requirements of the version of the National Fire Protection Association (NFPA), "*National Electrical Code"*, currently being enforced by the Colorado State Electrical Inspector.

25. LIGHTING FIXTURES:

A $ amount is usually budgeted for lighting fixtures and should be stated.

26 INSULATION:

_____Acceptable thermal resistance values:

The criteria for new and existing construction, established in RD Instruction 1924-A, Exhibit D, should be satisfied and the exact materials to be used should be clearly identified. Also reference **ARCHITECTURAL TECHNICAL GUIDE 0015 (January 1, 2005)** Thermal Performance Supplement for Existing Construction Financed by the USDA/Rural Housing Service's Section 502 and Section 504 Single Family Housing Programs and http://www.rurdev.usda.gov/co/

_____Identification/certification requirements:

The insulation installer should: (1) provide a written certification to the borrower which would state the following information and (2) affix a card to the structure in the attic, near the access panel, which would also state this information:

(a) Name of the installer,
(b) Installation date(s),
(c) Insulation types and "R" values used, and
(d) Manufacturer(s) of the insulation types installed.

27. MISCELLANEOUS:

_____Required general codes and standards compliance:

A statement should be provided which would require that all work performed must comply strictly with all applicable Rural Development "Development Standard", as superseded by conflicting and more stringent State and local requirements.

Rural Development's "Development Standards" are summarized in **ARCHITECTURAL TECHNICAL GUIDE 0022 (January 1, 2005)** Development Standards: Requirements for New and Existing SFH and MFH Construction Projects.
http://www.rurdev.usda.gov/co/

HARDWARE:

_____Acceptable door hardware:

All passage door hardware should comply with American National Standards Institute (ANSI), Standard A156.2.

All passage door hardware for residences intended to be used by persons with mobility impairments should conform to the *"Uniform Federal Accessibility Standards"* (UFAS). The UFAS may be downloaded from the following Internet site:
http://www.access-board.gov/ufas/ufas-html/ufas.htm

SPECIAL EQUIPMENT:

_____Acceptable residential appliances:

All appliances to be furnished should be identified.

Residences especially constructed for persons with mobility impairments should be equipped with a range/oven with front mounted controls.

PORCHES:

_____Acceptable porches:

The exact size of porches should be identified. Normally door landings should be approximately 4'-0" x 4'-0" in size.

Concrete porches should be secured to the foundation wall with reinforcing bars and should slope away from the foundation at 1/8" per foot, for shallow drainage.

Wood porches may be used on steeper sites. They should be constructed as follows:

Application	Wood type
Structural supporting framework	Pressure-treated lumber only
Decking	Pressure-treated lumber or Foundation grade redwood

TERRACES:

The requirements are the same as for Section 27., Porches.

GARAGES:

_____Acceptable garages:

Garage slabs should slope toward the overhead door(s) at 1/8" per foot, for shallow drainage.

Garage slabs should be constructed as discussed in Section 2., Foundations.

Garage slabs should be elevated about ½-inch to 1" above the adjacent driveway surface, at the overhead door location.

Garage slabs should have a continuous ½-inch expansion joint between the slab and the surrounding foundation walls, for slab isolation from structural foundation walls.

Garage slabs should be subdivided by control joints into maximum 200 s.f. areas.

Garages should not utilize a monolithically poured foundation and should have a separate foundation wall extending below frost depth.

WALKS AND DRIVEWAYS:

_____Acceptable walks:

Sidewalks should be constructed of concrete as discussed in Section 2., Foundations.

Full dimensioning should be provided on the construction drawings. 3'-0" wide sidewalks should normally be provided.

1/2" expansion joints should be provided between all sidewalks and steps, porches, and foundation walls.

Sidewalks should be provided with control joints at 3'-0" to 5'-0" on center.

_____Acceptable parking pads:

Concrete parking pads should be constructed as discussed in Section 2., Foundations.

Either a concrete or asphalt parking pad should be provided and should slope away from foundation walls at 1/8" per foot, for shallow drainage.

1/2" expansion joints should be provided between all concrete parking pads and steps, porches, and foundation walls.

Parking pads should be subdivided by control joints into maximum 200 s.f. areas.

_____Acceptable driveways:

All weather driveway surfacing should be provided. The surfacing material selected should be typical in the area.

Driveways should be minimum 10'-0" wide.

Gravel driveways should contain a minimum 3", compacted, uniform depth of roadbase with a maximum particle size of 3/4".

Asphalt driveways should consist of a minimum 2-1/2" uniform depth of asphalt, applied over a prime coat (allowed to penetrate for minimum 2 days before applying paving), applied over a uniform 4" deep base of 3/4" to 1-1/2" aggregate material.

Concrete driveways should consist of a 4" thick concrete slab, constructed as discussed in Section 2., Foundations.

OTHER ONSITE IMPROVEMENTS:

_____Acceptable retaining walls:

Retaining walls exceeding 4'-0" in height should be designed by a professional engineer.

LANDSCAPING, PLANTING, AND FINISH GRADING:

_____Acceptable landscaping:

All proposed landscaping materials should be identified.

Newly constructed residences should normally be provided with the following plant, and other, materials by the contractor, however, the landscaping installation may be provided by the homeowner as well:

(a) Grass, bark, and/or gravel soft landscaping for the complete front, complete side, and partial rear (within 20'-0" of the residence) yards, prepared as discussed under Section 27., Acceptable site preparation for ground covers, below.

(b) Trees and shrubs, as discussed under Section 27., Acceptable trees and shrubs, below.

_____Acceptable site preparation for ground covers:

Sites should be suitably graded, raked, fertilized, etc. to receive the intended ground cover, as follows:

Proposed Ground Cover	Required Site Preparation	Required Material Installation
Gravel:	Site grading to USDA's slope requirements. Site raked of cobbles over 1" in size.	6-mil polyethylene film or a fabric weed barrier installed on grade, 6" lap. 3" depth of gravel, as selected by the homeowner, installed. Edging installed at the perimeter.
Bark:	Site grading to USDA's slope requirements. Site raked of cobbles over 1" in size.	6-mil polyethylene film or a fabric weed barrier installed on grade, 6" lap. 3" depth of bark, as selected by the homeowner, installed. Edging installed at the perimeter.
Seeded or sodded lawn:	Site grading to USDA's slope requirements. Site raked of cobbles over 1" in size. Stored or imported topsoil installed for a 3" total depth. Topsoil enhanced as discussed below.**	Seeded materials should be a drought resistant mix, installed as discussed below.* Sodded materials should be a drought resistant species, installed as discussed below.*

*Seed and sod materials: All materials should be drought resistant native grass varieties. Whether seeded or sodded, the contractor should: (1) initially fertilize the lawn and (2) guarantee a healthy, vigorous, and weed free stand of grass with good color when the property is transferred to the homeowner.

**Topsoil enhancement: Suitable topsoil to support adequate growth of a lawn should be provided. Imported topsoil should be installed if adequate stockpiled topsoil cannot be found at the site. All topsoil should be natural, fertile, friable soil, without excessive alkaline or toxic substances, graded to eliminate stones in excess of 1" diameter, and free of debris, excessive clay, and vegetation. Topsoil should be enhanced with a 1" depth of shredded mountain peat or manure and with treble superphosphate at the rate of one 50-pound bag per 2,500 s.f. plus 5-10-5 fertilizer at the rate of one 50-pound bag per 2,500 s.f. This mixture should then be rototilled to a minimum depth of 8 inches. The tilled area should be settled, fine graded, and raked to meet the desired finish grade. All coarse soil lumps, rocks, roots, and weeds exceeding 1" in size should be removed. The surface should be smooth, loose, and of fine texture, staying 1" below all paving edges.

_____Acceptable trees and shrubs:

A minimum of one 1-1/2" caliper tree and five shrubs with a minimum 18" diameter spread, species appropriate for the local climate, should be installed at locations acceptable to the homeowner and in accordance with any Rural Development Local Office recommendations.

No trees or shrubs should be installed within 5'-0" of a building foundation wall.

All trees and shrubs should be grown in accordance with good horticultural practice and should be healthy, vigorous, and free of disease, insects, eggs, larvae, and defects such as knots, sun-scald, injuries, wind-burn, abrasions, or disfigurement.

All trees and shrubs should be planted in pits at least one foot greater in diameter than their ball of earth or spread of roots. The bottom of all plant areas should be loosened and a layer of topsoil at least 2" thick should be added to each pit so the ball of roots would rest thereon when the plant materials were set to the required grade. Pits should be backfilled with a mixture of native soil and peat moss. The backfilled soils should be thoroughly tamped and watered and a mound of earth should be formed around the edge of each tree and shrub in the form of a shallow saucer. No filling should occur around the trunks of trees and shrubs.

All trees should be triple guy-wired with canvas or rubber collars.

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Colorado Rural Development Technical Requirements for New, Existing, and Additions to Existing Single Family Housing Construction

(The following requirements are presented in the same sequence occurring on Form RD 1924-2, *"Description of Materials"*, and are intended to modify those contained on Form RD 1924-2, *"Description of Materials"*, as determined by the homeowner and the USDA/Rural Development Local Office representative.)

1. EXCAVATION:

_____Acceptable sub grades for foundation and slab work:

All sub grades for foundation and slab work should comply with the recommendations of the engineered foundation design, due to the variability in subsoils bearing qualities. Also reference **ARCHITECTURAL TECHNICAL GUIDE 0002 (January 1, 2005)** Professional Foundation and Concrete Slab-on-Grade Design and Certification: Requirements for Single Family Housing New Construction and Additions.

http://www.rurdev.usda.gov/co/

2. FOUNDATIONS:

_____Minimum concrete compressive strength:

Application	Minimum 28-day compressive strength (psi)
Footings	2,000
Foundation walls	3,000*
Interior slabs	3,000
Exterior slabs	3,500*

*air-entrained @ 5-7%

_____Minimum reinforcing:

Application	Minimum reinforcing
Foundation wall	2 - #5 deformed rib steel bars, located in the footing or at the bottom of the foundation wall
Slabs	6x6 10/10 steel welded wire mesh or fiberglass strands

_____Sillplates:

Acceptable wood products: foundation grade redwood or pressure-treated lumber.

_____Anchor bolts:

Minimum 1/2" diameter.

Minimum 7" embedment in concrete foundation system.

Minimum 2 bolts per piece of lumber.

One bolt within 12" of each end of each piece of lumber.

Maximum spacing: 6'-0" o.c.

_____Posts under girders:

Acceptable products:

Application	Acceptable material
Bottom of post is > 6" above grade	Pressure-treated lumber, Foundation redwood, Untreated lumber, Reinforced concrete block piers, Reinforced concrete piers, or Steel columns
Bottom of post is within 6" of grade	Pressure-treated lumber, Foundation redwood, Reinforced concrete block piers, Reinforced concrete piers, or Steel columns

All posts should be adequately secured at the top and bottom.

_____Termite protection:

All work should be accomplished by a Colorado licensed applicator.

Treatment required at all locations below 8,500 feet above sea level.

_____Crawlspace ventilation:

Crawl space floors should be covered with minimum 6-mil polyethylene film, lapped minimum 6".

_____Acceptable foundation insulation:

Application	Method
Framed and masonry wall areas above exterior finish grade:	Minimum R=19 rigid, batt, or sprayed insulation*
Framed and masonry wall areas below exterior finish grade:	Minimum R=10 rigid, batt, or sprayed insulation

Crawlspaces: Foundation wall insulation to be installed down to within 2 inches from **Exhibit C**

the top of exposed footings and/or to within 6 inches of the crawlspace floor elevation.

Basements: Foundation wall insulation to be installed minimum 4 feet down basement walls.

*Protect exterior located insulation above finish grade by a suitable flashing or similar product.

3. CHIMNEYS:

All kitchen and bathroom exhaust fan duct systems should contain a backdraft damper and should discharge directly to the exterior via wall or roof located jacks. Exhaust fan duct systems should not discharge into attics, crawlspaces, or basements. Also reference **ARCHITECTURAL TECHNICAL GUIDE 0006(January 1, 2005)** Kitchen and Bathroom Exhaust Ventilation: Requirements for New and Existing Single Family Housing and Multi-Family Housing Construction.

http://www.rurdev.usda.gov/co/

4. FIREPLACES:

Fireplaces should be installed in strict accordance with manufacturer's installation data.

5. EXTERIOR WALLS:

_____Acceptable corner bracing:

The exact method of bracing to be used for wind resistance should be identified. Several methods are permitted by the International Building Code.

_____Acceptable sheathing:

The exact sheathing material should be identified.

_____Acceptable siding:

The exact siding material(s) to be used should be identified. All siding materials should be installed in strict accordance with manufacturer's printed instructions, including the use of acceptable underlying supporting framing systems.

_____Masonry veneer:

Masonry veneer should be installed with: (1) an air space between the veneer and the wall framing and (2) weep holes located at maximum 4'-0" o.c.

6. FLOOR FRAMING:

_____Joists:

The exact wood species, grade(s), size(s), and repetitive spacing(s) to be used should be identified. Factory engineered truss joist systems are acceptable.

7. SUBFLOORING:

_____Acceptable subflooring installation:

All subflooring should be fastened in accordance with International Building Code requirements as well as manufacturer's printed recommendations. All subflooring should be glued directly to underlying floor framing members. The exact type of subflooring materials to be used should be identified and should be span-rated for the intended spans.

8. FINISH FLOORING:

(This section is intended for finish wood floors only. Other finish floor products should be specified in section 21.)

9. PARTITION FRAMING:

_____Framing materials and installation:

The exact wood species, grade(s), size(s), and repetitive spacing(s) should be identified.

10. CEILING FRAMING:

(This section is applicable in situations where rafters would be used in conjunction with separate roof framing rather than situations where pre-engineered roof trusses would be employed.)

11. ROOF FRAMING:

_____Acceptable roof framing:

Where rafters are to be used, the exact wood species, grade(s), size(s), and repetitive spacing(s) should be identified.

Roof truss systems should be pre-engineered.

12. ROOFING:

_____Acceptable sheathing:

The exact sheathing types, thicknesses, and span ratings should be identified.

_____Acceptable roofing:

The exact type of roofing material to be used should be identified. Composition asphalt or fiberglass shingles, in either a 3-tab or T-lock profiles, are acceptable provided they have a minimum weight of 220 pounds per square (square = 100 s.f.).

_____Acceptable roof underlayment:

The exact type of roof underlayment should be identified. A single ply of 15 pounds per square underlayment, with the thickness doubled for the lowest three feet of the roof surface, would be acceptable except in areas with historically heavy snow conditions, where additional ice damming protection should be specified.

_____Acceptable flashing:

The exact type of flashing material to be used should be identified.

_____Acceptable attic ventilation:

Attic ventilation should be provided in accordance with International Building Code requirements.

Gable-end type vents are discouraged and a combination of soffit and ridge vents is encouraged.

13. GUTTERS AND DOWN SPOUTS:

_____Acceptable gutters:

A complete gutter/downspout/splashblock system should be specified whenever one or more of the following situations apply:

(a) The roof overhang for a one-story portion of a structure is less than 12" wide;
(b) The roof overhang for a two-story portion of a structure is less than 24" wide;
(c) A building entrance is on the low side of eaves;
(d) Problem soil conditions are present; or
(e) The homeowner desires to have such a system installed.

Minimum 30" long concrete or plastic splashblocks or minimum 30” long downspout extensions should be specified for positioning under all downspouts and hosebibs and they should be properly installed to drain away from foundation walls.

If problem soil conditions are present, minimum 60" long hinged downspout extensions should be installed in lieu of the splashblocks or shorter downspout extensions.

Either galvanized steel, natural aluminum, factory painted steel or aluminum, or plastic gutter/downspout systems should be installed in accordance with the manufacturer's printed instructions.

14. LATH AND PLASTER:

(Lath and plaster construction techniques have mostly been supplanted by gypsum drywall techniques.)

_____Acceptable drywall thicknesses:

Minimum 5/8" thick standard gypsum drywall should be installed at ceiling locations where the supporting framing spacing exceeds 16" o.c.

_____Acceptable drywall types:

Moisture-resistant drywall should be installed at all bathroom splash areas.

15. DECORATING:

_____Special painting requirements:

Paint with any lead content should not be used.

A minimum of 2 coats of paint or 1 coat of primer + 1 coat of paint should be provided in all cases.

16. INTERIOR DOORS AND TRIM:

_____Acceptable finishes:

The exact type of finish and hardware should be identified.

Painted, stained, or prefinished doors and trim are acceptable.

17. WINDOWS:

_____Acceptable aluminum windows:

Aluminum windows should contain a thermal break in both the fixed and operable sashes.

_____Window installation:

The perimeter of all window units should be attractively caulked with a paintable silicon compound at both the interior and exterior sides. Windows should be flashed in accordance with manufacturer's printed instructions.

_____Acceptable window glazing types:

The exact type of glazing to be installed should be identified. The most cost and thermally effective glazing type appears to be a low-emissivity (low e) coated, 2-pane, glazing assembly with an evacuated space between the glass panes.

18. ENTRANCES AND EXTERIOR DETAIL:

_____Acceptable entrance doors:

All exterior doors and doors between the living area and garages should be a painted, pre-hung, steel-clad, insulated-core type.

19. CABINETS AND INTERIOR DETAIL:

_____Acceptable kitchen and bathroom cabinets:

All kitchen and bathroom cabinets shall be labeled or otherwise certified as conforming to the American National Standards Institute/Kitchen Cabinet Manufacturers Association (ANSI/KCMA) Standard A161.1-1990.

20. STAIRS:

(There are no special requirements other than general code compliance.)

21. SPECIAL FLOORS AND WAINSCOT:

_____Acceptable kitchen, bathroom, and utility room flooring materials:

The exact type of flooring materials to be used should be identified.

Only sheet vinyl flooring, conforming to either Federal Specification, FS L-F-001641-71, FS L-F-475A, or FS L-F-00450A, should be installed in kitchens, bathrooms, and utility rooms.

All carpeting should conform to either: (1) U.S. Department of Housing and Urban Development (HUD), Use of Materials Bulletin, UM-44d, Type 1, Class 1, for non-handicap applications, or (2) HUD, Use of Materials Bulletin, UM-44-d, Type 2, Class 1, for handicap applications.

All proposed carpeting materials should be currently certified by one of the independent testing laboratories as complying with UM-44d. Also reference **ARCHITECTURAL TECHNICAL GUIDE 0003 (January 1, 2005)** Carpet and Carpet Pad Certification: Requirements for Single Family Housing New Construction and Additions

http://www.rurdev.usda.gov/co/

All proposed bathroom accessories should be exactly identified.

22. PLUMBING:

_____Acceptable plumbing fixtures:

The following types of fixtures are recommended, for their combined advantages of longevity and modest cost:

Application	Type	Color
Kitchen sink:	Stainless steel	Natural
Lavatory:	Porcelain steel	White
	Vitreous china, or	White
	ABS plastic*	White
Water closet:	Two-compartment	White
Bathtub/enclosure:	Fiberglass*	White
Tub/shower/enclosure:	Fiberglass*	White
Shower/enclosure:	Fiberglass*	White

*All plastic and fiberglass plumbing fixtures should be labeled as conforming to U.S. Department of Housing and Urban Development, Use of Materials Bulletin, UM-73a.

_____Washer hot and cold water supplies:

A washer drainbox, with hot and cold water hook-ups, should be provided.

_____Acceptable hosebibs:

A minimum of two (2) hosebibs should be provided, one for the front yard and one for the rear yard.

All hosebibs should be a freezeproof type and should be plumbed with an inline backflow preventer.

_____Acceptable water heaters:

Water heaters should be provided with a minimum 5-year warranty against tank leaks.

Water heaters should be plumbed with dielectrically compatible unions.

Water heaters should be provided with a temperature and pressure relief valve, drained directly to either: (1) the exterior of the residence or (2) 6" above the floor, if a floor drain is provided next to the appliance.

Water heaters are recommended to be sized as follows:

Application (# of bedrooms/bathrooms)	Fuel Type	Minimum Tank Size (Gallons)	Minimum Recovery Rate (Gallons per hour)
2/1	Gas	30	30
2/1	Electric	30	14
3/1	Gas	30	30
3/1	Electric	40	18
3/1.5	Gas	30	30
3/1.5	Electric	40	18
4/2	Gas	40	32
4/2	Electric	50	22

_____Acceptable footing drain connections:

Where required, footing drains should connect to one of the following reliefs, ranked from most to least preferable, from top to bottom:

(a) Piped to a storm sewer system.
(b) Daylighted to a street storm sewer system, preferably on a south-facing slope.
(c) Daylighted to a point on the property, preferably on a south-facing slope.
(d) Piped to a sanitary sewer system, if permitted by the local building department.

All footing drainage systems should be sloped at minimum 1/8" per foot. Reference **ARCHITECTURAL TECHNICAL GUIDE 0002 (January 1, 2005)** Professional Foundation and Concrete Slab-on-Grade Design and Certification: Requirements for Single Family Housing New Construction and Additions for more information on when a footing drain system would be required.
http://www.rurdev.usda.gov/co/

23. HEATING:

_____Acceptable boiler/hot water baseboard heating systems:

Boilers are recommended to be sized as follows:

Boiler Efficiency Rating (percent)	Boiler Input Rating (BTUH*) for Altitude (FASL**) below 4,000'-5,000'	5,000'-6,000'	6,000'+
65-70	60,000-70,000	65,000-75,000	70,000-80,000
70-80	55,000-65,000	60,000-70,000	65,000-75,000
80-90	50,000-60,000	55,000-65,000	60,000-70,000
90+	45,000-55,000	50,000-60,000	55,000-65,000

*British Thermal Units per Hour **Feet above Sea Level

All circulating piping, located in unheated spaces, should be insulated with a minimum 1" thick cellular foam jacket.

_____Acceptable furnace/forced air heating systems:

Furnaces are recommended to be sized as follows:

Furnace Efficiency Rating (percent)	Furnace Input Rating (BTUH*) for Altitude (FASL**) below		
	4,000'-5,000'	5,000'-6,000'	6,000'+
65-70	60,000-70,000	65,000-75,000	70,000-80,000
70-80	55,000-65,000	60,000-70,000	65,000-75,000
80-90	50,000-60,000	55,000-65,000	60,000-70,000
90+	45,000-55,000	50,000-60,000	55,000-65,000

*British Thermal Units per Hour **Feet above Sea Level

All ductwork, located in unheated spaces, should be insulated with a minimum 1" thick batt insulation jacket.

ARCHITECTURAL TECHNICAL GUIDE 0016 (January 1, 2005) Summary of Thermal Performance Construction Standards and Eligible Locations for Air Conditioning for New and Existing Construction Financed by the USDA/Rural Housing Service's Single Family Housing (SFH) Programs.
http://www.rurdev.usda.gov/co/

_____Acceptable electric resistance heating systems:

All types of electric resistance heating systems are considered acceptable. The amount of heat source to be installed in the residence should be clearly identified.

_____Acceptable kitchen rangehoods:

Kitchen rangehoods should meet the requirements of **ARCHITECTURAL TECHNICAL GUIDE 0006 (January 1, 2005)** Kitchen and Bathroom Exhaust Ventilation: Requirements for New and Existing Single Family Housing and Multi-Family Housing Construction.
http://www.rurdev.usda.gov/co/

_____Acceptable bathroom ventilation:

Bathroom exhaust vents should meet the requirements of **ARCHITECTURAL TECHNICAL GUIDE 0006 (January 1, 2005)** Kitchen and Bathroom Exhaust Ventilation: Requirements for New and Existing Single Family Housing and Multi-Family Housing Construction.
http://www.rurdev.usda.gov/co/

_____Acceptable dryer duct exhausting:

A dryer duct sleeve, with integral backdraft damper, should be provided at an exterior wall for the laundry area.

24. ELECTRIC WIRING:

_____Acceptable wiring conductors for electrical service and branch circuits:

It should be stated that all electrical power systems should meet the requirements of the version of the National Fire Protection Association (NFPA), "*National Electrical Code"*, currently being enforced by the Colorado State Electrical Inspector.

25. LIGHTING FIXTURES:

A $ amount is usually budgeted for lighting fixtures and should be stated.

26 INSULATION:

_____Acceptable thermal resistance values:

The criteria for new and existing construction, established in RD Instruction 1924-A, Exhibit D, should be satisfied and the exact materials to be used should be clearly identified. Also reference **ARCHITECTURAL TECHNICAL GUIDE 0015 (January 1, 2005)** Thermal Performance Supplement for Existing Construction Financed by the USDA/Rural Housing Service's Section 502 and Section 504 Single Family Housing Programs and

http://www.rurdev.usda.gov/co/

_____Identification/certification requirements:

The insulation installer should: (1) provide a written certification to the borrower which would state the following information and (2) affix a card to the structure in the attic, near the access panel, which would also state this information:

(a) Name of the installer,
(b) Installation date(s),
(c) Insulation types and "R" values used, and
(d) Manufacturer(s) of the insulation types installed.

27. MISCELLANEOUS:

_____Required general codes and standards compliance:

A statement should be provided which would require that all work performed must comply strictly with all applicable Rural Development "Development Standard", as superseded by conflicting and more stringent State and local requirements.

Rural Development's "Development Standards" are summarized in **ARCHITECTURAL TECHNICAL GUIDE 0022 (January 1, 2005)** Development Standards: Requirements for New and Existing SFH and MFH Construction Projects.

http://www.rurdev.usda.gov/co/

HARDWARE:

_____Acceptable door hardware:

All passage door hardware should comply with American National Standards Institute (ANSI), Standard A156.2.

All passage door hardware for residences intended to be used by persons with mobility impairments should conform to the *"Uniform Federal Accessibility Standards"* (UFAS). The UFAS may be downloaded from the following Internet site:

http://www.access-board.gov/ufas/ufas-html/ufas.htm

SPECIAL EQUIPMENT:

_____Acceptable residential appliances:

All appliances to be furnished should be identified.

Residences especially constructed for persons with mobility impairments should be equipped with a range/oven with front mounted controls.

PORCHES:

_____Acceptable porches:

The exact size of porches should be identified. Normally door landings should be approximately 4'-0" x 4'-0" in size.

Concrete porches should be secured to the foundation wall with reinforcing bars and should slope away from the foundation at 1/8" per foot, for shallow drainage.

Wood porches may be used on steeper sites. They should be constructed as follows:

Application	Wood type
Structural supporting framework	Pressure-treated lumber only
Decking	Pressure-treated lumber or Foundation grade redwood

TERRACES:

The requirements are the same as for Section 27., Porches.

GARAGES:

_____Acceptable garages:

Garage slabs should slope toward the overhead door(s) at 1/8" per foot, for shallow drainage.

Garage slabs should be constructed as discussed in Section 2., Foundations.

Garage slabs should be elevated about ½-inch to 1" above the adjacent driveway surface, at the overhead door location.

Garage slabs should have a continuous ½-inch expansion joint between the slab and the surrounding foundation walls, for slab isolation from structural foundation walls.

Garage slabs should be subdivided by control joints into maximum 200 s.f. areas.

Garages should not utilize a monolithically poured foundation and should have a separate foundation wall extending below frost depth.

WALKS AND DRIVEWAYS:

_____Acceptable walks:

Sidewalks should be constructed of concrete as discussed in Section 2., Foundations.

Full dimensioning should be provided on the construction drawings. 3'-0" wide sidewalks should normally be provided.

1/2" expansion joints should be provided between all sidewalks and steps, porches, and foundation walls.

Sidewalks should be provided with control joints at 3'-0" to 5'-0" on center.

_____Acceptable parking pads:

Concrete parking pads should be constructed as discussed in Section 2., Foundations.

Either a concrete or asphalt parking pad should be provided and should slope away from foundation walls at 1/8" per foot, for shallow drainage.

1/2" expansion joints should be provided between all concrete parking pads and steps, porches, and foundation walls.

Parking pads should be subdivided by control joints into maximum 200 s.f. areas.

_____Acceptable driveways:

All weather driveway surfacing should be provided. The surfacing material selected should be typical in the area.

Driveways should be minimum 10'-0" wide.

Gravel driveways should contain a minimum 3", compacted, uniform depth of roadbase with a maximum particle size of 3/4".

Asphalt driveways should consist of a minimum 2-1/2" uniform depth of asphalt, applied over a prime coat (allowed to penetrate for minimum 2 days before applying paving), applied over a uniform 4" deep base of 3/4" to 1-1/2" aggregate material.

Concrete driveways should consist of a 4" thick concrete slab, constructed as discussed in Section 2., Foundations.

OTHER ONSITE IMPROVEMENTS:

_____Acceptable retaining walls:

Retaining walls exceeding 4'-0" in height should be designed by a professional engineer.

LANDSCAPING, PLANTING, AND FINISH GRADING:

_____Acceptable landscaping:

All proposed landscaping materials should be identified.

Newly constructed residences should normally be provided with the following plant, and other, materials by the contractor, however, the landscaping installation may be provided by the homeowner as well:

(a) Grass, bark, and/or gravel soft landscaping for the complete front, complete side, and partial rear (within 20'-0" of the residence) yards, prepared as discussed under Section 27., Acceptable site preparation for ground covers, below.

(b) Trees and shrubs, as discussed under Section 27., Acceptable trees and shrubs, below.

_____Acceptable site preparation for ground covers:

Sites should be suitably graded, raked, fertilized, etc. to receive the intended ground cover, as follows:

Proposed Ground Cover	Required Site Preparation	Required Material Installation
Gravel:	Site grading to USDA's slope requirements. Site raked of cobbles over 1" in size.	6-mil polyethylene film or a fabric weed barrier installed on grade, 6" lap. 3" depth of gravel, as selected by the homeowner, installed. Edging installed at the perimeter.
Bark:	Site grading to USDA's slope requirements. Site raked of cobbles over 1" in size.	6-mil polyethylene film or a fabric weed barrier installed on grade, 6" lap. 3" depth of bark, as selected by the homeowner, installed. Edging installed at the perimeter.
Seeded or sodded lawn:	Site grading to USDA's slope requirements. Site raked of cobbles over 1" in size. Stored or imported topsoil installed for a 3" total depth. Topsoil enhanced as discussed below.**	Seeded materials should be a drought resistant mix, installed as discussed below.* Sodded materials should be a drought resistant species, installed as discussed below.*

*Seed and sod materials: All materials should be drought resistant native grass varieties. Whether seeded or sodded, the contractor should: (1) initially fertilize the lawn and (2) guarantee a healthy, vigorous, and weed free stand of grass with good color when the property is transferred to the homeowner.

**Topsoil enhancement: Suitable topsoil to support adequate growth of a lawn should be provided. Imported topsoil should be installed if adequate stockpiled topsoil cannot be found at the site. All topsoil should be natural, fertile, friable soil, without excessive alkaline or toxic substances, graded to eliminate stones in excess of 1" diameter, and free of debris, excessive clay, and vegetation. Topsoil should be enhanced with a 1" depth of shredded mountain peat or manure and with treble superphosphate at the rate of one 50-pound bag per 2,500 s.f. plus 5-10-5 fertilizer at the rate of one 50-pound bag per 2,500 s.f. This mixture should then be rototilled to a minimum depth of 8 inches. The tilled area should be settled, fine graded, and raked to meet the desired finish grade. All coarse soil lumps, rocks, roots, and weeds exceeding 1" in size should be removed. The surface should be smooth, loose, and of fine texture, staying 1" below all paving edges.

_____Acceptable trees and shrubs:

A minimum of one 1-1/2" caliper tree and five shrubs with a minimum 18" diameter spread, species appropriate for the local climate, should be installed at locations acceptable to the homeowner and in accordance with any Rural Development Local Office recommendations.

No trees or shrubs should be installed within 5'-0" of a building foundation wall.

All trees and shrubs should be grown in accordance with good horticultural practice and should be healthy, vigorous, and free of disease, insects, eggs, larvae, and defects such as knots, sun-scald, injuries, wind-burn, abrasions, or disfigurement.

All trees and shrubs should be planted in pits at least one foot greater in diameter than their ball of earth or spread of roots. The bottom of all plant areas should be loosened and a layer of topsoil at least 2" thick should be added to each pit so the ball of roots would rest thereon when the plant materials were set to the required grade. Pits should be backfilled with a mixture of native soil and peat moss. The backfilled soils should be thoroughly tamped and watered and a mound of earth should be formed around the edge of each tree and shrub in the form of a shallow saucer. No filling should occur around the trunks of trees and shrubs.

All trees should be triple guy-wired with canvas or rubber collars.

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